

PURESTREAM TYPE "A" COMMINUTOR INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

GENERAL DESCRIPTION

The comminutor is an automatic mechanical device used to shred sewage solids prior to treatment. Three standard sizes are used to cover ranges of flow up to 1,020 GPM. The Model A-5 has a 5" cutter drum for flows up to 164 GPM, the Model A-8 has an 8" cutter drum for flows up to 360 GPM, and the A-12 has a 12" cutter drum for flows up to 1,020 GPM. The models differ only in motor size, cutter diameter and ratio of speed reduction. They may be installed in a flow chamber, flanged pipe line, treatment plant bar screen or the wet well of a lift station. Shaft extensions are also available to meet specific needs.

Of the hundreds of comminutor installations of various manufacture, the most undesirable feature common to all is the inability to continue to pass sewage flow in the event of stopping of the unit drive motor.

The primary causes of motor stoppage are (1) power supply failure and (2) motor overload with subsequent overload protection disconnection due to jamming of the cutting mechanism.

Most power supply failures are of short duration but most comminutors use a manual reset type starter and in the interim period between stoppage and manual restart, clogging results.

Most jamming of the cutting mechanism and subsequent motor stoppage is caused by hard or tough foreign objects with clogging resultant as before in the interim.

To overcome these two undesirable features, the Model A comminutor utilizes an automatic control system which features (1) automatic motor reset in the event of power supply failure (which is instantaneous with power resumption) and (2) an automatic drive motor reversal with time delay recycle in the event that objects which would jam an ordinary comminutor are encountered.

OPERATION OF COMMINUTOR

Raw sewage enters the comminutor thru the open top inlet trough, flows into the comminutor housing and then passes through the 1/4" slots in the rotating drum. Any sewage solids too large to pass thru the slots are caught up by the projecting teeth on the rotating drum and carried to the fixed cutter comb where the intermeshing of the projecting teeth with the slotted comb cut, shear and shred the solids until they are small enough to be carried thru the slots in the rotating drum by the sewage flow.

Should an exceptionally hard or tough object be encountered, jamming the cutting teeth, the automatic control system reverses the rotation of the drum approximately one revolution. After a momentary pause, forward direction of rotation is resumed. This operation is continued until the jamming object is reduced to small enough size to pass thru the rotating drum. Normal forward rotation is then continued.

In the event of a power outage, the comminutor will resume forward rotation as soon as power is restored. In the event of a prolonged power outage in which case sewage solids may cause clogging of the slots in the normally rotating drum, the sewage can bypass the comminutor by overflowing the top inlet trough.

INSTALLATION

Inspection and Storage: Immediately upon receiving comminutor, unpack and examine to see if any damage has resulted from shipment. Report any damage at once to the trucking company and to the factory. If it is necessary to store the comminutor for any length of time before installing and operation, it should be stored in a clean, dry place to protect it against excessive moisture, physical damage and construction dust. Leave unit on skid until ready for installation. The reducer should be filled with a suitable rust-preventative for protecting of interior parts which might otherwise corrode or rust when reducer sweats. If unit has a shaft extension, care should be taken to protect shaft from strain and universal joints from damage and moisture.

If the unit is to be taken out of operation during the winter, or shut down for a long period, the following precautions should be taken: (1) Open drain plug and drain gear reducer housing. (2) Coat cutters with a preservative to prevent rusting. (3) Fill gear reducer with fuel oil or kerosene. (4) Store in a dry place. Note: The main concern is to make sure the housing will not crack from freezing and the cutters do not rust.

Location of Units: Before installing the unit in place, make sure all excessive debris and rocks, sand or grit is flushed from the flow channel. Excessive debris can damage cutting components and reduce their efficiency. The unit should be secured rigidly in all applications to prevent misalignment due to vibration. When using flanged pipe connections, normal piping precautions should be observed. If the unit is supplied for bar screen mounting inside the treatment plant, care should be taken to support the flanged inlet securely, keeping unit as level as possible. All comminutors shipped with treatment plants or accessory equipment will have necessary mounting provisions included.

Wiring of Motor: All standard Model A comminutors are supplied with 1/2 or 3/4 H.P., 208-230/460 volt, 3 phase motors or 115/230 volt, single phase motors. Automatic control devise is secured and prewired to the motor at the factory. The control panel is mounted to the comminutor gear reducer by a bracket bolted to the back side of control panel. Three motor leads are prewired to the control terminal block and must not be changed in the field. If the comminutor is to be used with a sewage treatment plant, the plant control panel will include a circuit breaker and wires should run from the treatment plant control panel terminal block to L₁ and L₂ on single phase motors and L₁, L₂ and L₃ on

three phase motors on the comminutor control panel. For other installations, provide a fused disconnect or circuit breaker protected power service to the comminutor panel.

OPERATION

Starting the Comminutor: The following steps should be followed before starting comminutor.

1. Check the inlet flow trough and cutter drum to make sure no debris or excessive rocks and sand is present.
2. Turn on "Comminutor" circuit breaker in treatment plant control panel or other fused disconnect switch at power source.
3. Check the comminutor control panel switches. The switch on the left hand side of the box is the main power off-on switch. Two additional switches are located on the forward/reverse, (blue) control relay. During normal operation the first switch, a Hand-Off-Automatic selector switch, should be in the "A" or auto position and the second switch, a Forward-Off-Reverse selector switch should be in the "Off" position. (The Forward-Off-Reverse selector switch should remain in the "Off" position during normal operation.
4. To start the comminutor turn the Off-On switch to the "On" position. The motor should then start, turning the cutter drum in a clockwise rotation when looking down from the top of the motor. Leave the other two switches in the "A" and off positions. This places the comminutor in the automatic mode, allowing it to automatically stop, reverse and return to the correct clockwise rotation should an object block the comminutor cutter teeth.
5. In order to remove the comminutor from its automatic mode place the Hand-Off-Automatic selector switch in the hand position and use the Forward-Off-Reverse selector switch to operate the comminutor.

Comminutor Operation: The following steps should be observed to keep the comminutor in efficient operating condition:

1. Keep comminutor running continuously to prevent overheating.
2. Check the inlet trough daily for foreign solids such as stones, metal objects, etc., and remove them.
3. Check the oil level in speed reducer weekly and lubricate as covered under "Lubrication".
4. Inspect cutter drum for broken or missing teeth periodically, and replace if necessary.
5. If comminutor should stop, check power source for blown fuses. Check power lines at control terminal block to see if power supply is present. If power is all right, the trouble may be an overloaded motor. Press in the overload button located on the motor housing to reset an overloaded motor. It is very important to observe "caution" label to prevent burnout of automatic reset overload element. If trouble cannot be located in control, contact factory for replacement or repair.

LUBRICATION

Motor: No lubrication required.

Shaft Bearings: No lubrication required.

Gear Reducer:

1. Maintain oil level in gear housing to upper hex head socket plugs in sides of gear housing (2 places). Lower plugs are for draining and changing oil. Filler plug is on top of housing.
2. The proper oil for use in the comminutor gear reducer is listed on the chart provided in the end of these instructions. Oil of one company should never be added to the oil of another company. When changing brand names, old oil should be completely drained from unit. Oil should be changed every month to assure long gear life. Never fill gear housing above plugs in sides. This causes leaking seals, rapid wear and overheating.

MAINTENANCE

Special Note: Preventative maintenance is the key to good operation. Close and regular observations of the comminutor operation is essential. Any irregularity should be checked out or reported before serious trouble develops.

Dismantling For Repair:

1. Turn off power supply at control panel circuit breaker or fused disconnect switch at the power source and disconnect line from comminutor control panel.
2. To remove control panel, loosen four (4) bolts in back of panel thru the mounting bracket. Disconnect motor leads from control terminal block.
3. To remove gear reducer from comminutor shell, take out four mounting bolts that hold reducer and lift reducer straight upward. The upper section of the shaft coupling is keyed to the drive shaft of the gear reducer and will be removed with the gear reducer. The coupling halves can be removed from the drive shaft and gear reducer by loosening the socket screws in the coupling halves. Care should be taken in removing the coupling halves from the reducer and drive shaft to prevent damage to the shafts.
4. To remove motor take out four mounting bolts around flange to speed reducer. Motor should be lifted straight out from gear reducer.
5. If neither motor nor speed reducer need to be removed, the complete assembly may be removed from the inlet trough by removing three bolts at base of column casting. This assembly includes the

complete drive shaft, cutter drum and bar cutter all intact. This assembly may be removed for inspection of cutter bar and teeth and lower drum mechanism.

6. Cutter drum may be removed by removing large elastic stop nut inside of drum that holds drum to shaft.

7. Cutter bar and teeth may be replaced by removing socket head set screws from both the bar and teeth. When replacing teeth or bar, be sure drum turns freely with teeth passing through cutter bar without touching it. Adjust teeth and bar until this condition is attained.

8. If the column assembly must be dismantled to replace bearings, remove nuts on shaft that holds shaft and bearings in place. Extreme care must be taken when replacing bearings that shaft is in perfect alignment and is not too tight, to allow shaft to turn freely. Bearings are special sealed bearings and need no lubrication.

Assembly Procedure: To assemble the comminutor, simply reverse the dismantling procedure. Care should be taken not to force any parts that do not seem to be in proper alignment. Be sure that keys are installed in shaft properly to prevent bending shaft. Tighten all bolts to prevent vibration damage.

Ordering and Returning Parts: When ordering major parts, be sure and specify the model and size of comminutor. Major parts are numbered and described as shown on the attached drawing. Major repair and overhaul is not recommended in the field because of alignment of new parts with worn parts. Repair of control or gear reducer is also discouraged, especially where warranties may cover parts.

When returning parts or complete units, make sure proper job name and number is attached and complete name and address for proper identification and return of new or repaired part. Comminutor must be cleaned of all debris and foreign matter before returning to Purestream factory. Pressure washing is the recommend method of cleaning the inlet trough, cutter teeth and drum. Failure to thoroughly clean the comminutor before shipping it to Purestream will result in additional charges included in the cost of repair. All returned units or parts must be sent prepared postage or freight. Also attach any special instructions or information pertaining to the trouble.

Should you need repair parts or factory repair for your comminutor, contact:

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